

Peoria, Ill. It is evidently a hybrid from this species and *Bidens frondosa*. The awns are downwardly barbed, and the marginal hairs upwardly turned, as in *B. frondosa*, while the rays and leaves are those of *C. aristosa*.

*C. involuocrata* Nutt. is said to have achenia with two short acute teeth, but was not seen. It is closely related to the last through its variety. Fig. 33 is probably a hybrid from this species and *Bidens frondosa*, collected by G. H. French in Ill., in 1878.

*C. bidentoides* Nutt. Achenia linear to narrowly cuneate, 4 to 5 lines long (largest of the genus), with two prominent awns  $\frac{1}{2}$  to  $\frac{2}{3}$  their length, slightly spreading, and minute awns from the lateral angles. (Fig. 29.)

Dr. Vasey collected near Washington, D. C., Sept. 23, 1888, a peculiar hybrid from this species and *Bidens connata*, which has the awns of both *Coreopsis* and *Bidens*, that is, they are hispid upward or downward or both ways.

*C. discoidea* Torr. & Gray. Achenia linear-oblong to cuneiform, 2 to 3 lines long; awns more or less prominent, erect or slightly spreading. (Figs. 30 *a* and 30 *b*.)

EXPLANATION OF PLATE XVI.—All drawings  $\times 10$ . Fig. 1. *C. nudata*. Fig. 2. *C. gladiata*. Figs 3, 4, 5. *C. angustifolia* (the first two from the same head. Fig. 6. *C. Leavenworthii*. Fig. 7. *C. Atkinsonia*. Fig. 8. *C. cardaminefolia*. Fig. 9. *C. tinctoria*. Fig. 10. *C. rosea*. Fig. 11. *C. Drummondii*. Figs. 12, 13. *C. coronata*. Fig. 14. *C. grandiflora*. Fig. 15. *C. pubescens*. Fig. 16*a*, 16*b*. *C. auriculata*. Fig. 17. *C. palmata*. Fig. 18. *C. verticillata*. Fig. 19. *C. delphinifolia*. Fig. 20. *C. senifolia*. Fig. 21. *C. tripteris*. Fig. 22. *C. latifolia*. Fig. 23. *C. aurea*. Fig. 24. *C. aurea*, var. *subintegra*. Figs. 25, 26. *C. trichosperma*. Fig. 27. *C. aristosa*. Fig. 28. *C. aristosa*, var. *mutica*. Fig. 29. *C. bidentoides*. Fig. 30*a*, 30*b*. *C. discoidea* (from same head). Fig. 31. *C. aristosa*  $\times$  *Bidens chrysanthemoides*. Fig. 32. *C. aristosa*  $\times$  *Bidens frondosa*. Fig. 33. *C. involuocrata*  $\times$  *Bidens frondosa*. Figs. 11, 14, 15, 16*b* represent the ventral side; all others show the dorsal.

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## BRIEFER ARTICLES.

**Sensitive stamens in Compositæ.**—It is well known that the flowers of several species of Compositæ are sensitive, among the leading of which are the centaureas and thistles. This fact, together with the great similarity of floral structures, has led me to look for movements in other species. Considerable quantities of the flowers to be studied were collected,



placed in a deep glass vessel filled with water, and set where there would be plenty of light and warmth, but to the exclusion of all insects naturally visiting such blossoms. After a few hours a jar was placed upon a table and the flowers inspected for sensitiveness. A large bull's-eye condenser was adjusted upon its tall stand so that a head of flowers came into full view. Then, with the eye intent upon the particular blossom, the various floral parts were touched with the point of a needle.

By this method the first reward was *Echinacea angustifolia*. In this the whole flower, when touched upon one side, will move in a direction opposite to that of the irritant; that is, if pushed by the needle upon the south side, the top of the flower will move south, and through a distance averaging its own diameter. At the same time there is a contraction or drawing down of the ring of anthers equal to one-half of the diameter. This motion takes place quickly and leaves the lemon-colored pollen exposed upon the tip of the style, which may already extend somewhat above the anther-ring. Unusually good results are obtained with flowers which as yet show no portion of the style. In such the ring will contract and show the first pollen in profusion upon the extremity of the style. After an hour or so the flower again becomes irritable, and the anthers will retreat farther, leaving a fresh supply of pollen exposed upon a lower section of the style. The contraction is such that in many instances there is a revolving motion to the flower, as has often been seen in the thistle. In the *Echinacea* there are none of the peculiar hairs exhibited by the thistle filament, the surface being smooth throughout.

The observations which have been stated for the *Echinacea* hold true in a general way for *Heliopsis lævis*, although there are minor differences not worthy our present attention.

A third species to be added to the list of sensitive flowers is *Lepachys pinnata*, and a fourth is *Rudbeckia hirta*.

With a good triplet and upon a bright hot day fair results may sometimes be obtained in the field, but as insects are usually abundant the laboratory method is much more satisfactory. The writer would be pleased to learn what other *Compositæ* have been found in this country illustrating sensitiveness of the stamens.—BYRON D. HALSTED, *Rutgers College, New Brunswick N. J.* [Mr. Thomas Meehan has investigated this matter at considerable length, but ascribes the movements to elasticity and not sensitiveness. See abstract of his paper in Proc. A. A. A. S., Phila. meeting, papers in Proc. Phila. Acad., and various abstracts and notes in this journal.—EDS.]

**Peronospora upon cucumbers.**—On May 8th, while taking a run through the greenhouses and grounds of Mr. J. T. Hill here in New Brunswick, my attention was attracted by the numerous light patches upon the leaves of some cucumber vines which were growing in a hot-bed and already bearing fruit suitable for the table. Upon examining these spots they were found to be due to a growth of some species of the genus *Per-*